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**ARTS, COMMERCE AND SCIENCE COLLEGE, LANDEWADI, BHOSARI – 39**

**Question Bank**

**CLASS : T.Y.B.Sc (COMPUTER SCIENCE)**

**SUBJECT : Theory of Computer Science**

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Q.1 ANSWERS THE FOLLOWING.

1. Write 5- tuples of DFA & NFA.
2. Write the condition for string acceptance in FA .
3. State equivalence theorem of NFA & DFA.
4. Define Epsilon– Closure.
5. State any two disadvantages of FA.
6. FA have only 1 start state True or False.
7. Write smallest possible string accepted by the regular expression  $(a+b)^*ab$ .
8. State pumping lemma for regular set.
9. Define Kleen Closure.
10. Which tool is used to prove language is not regular.
11. Define type – 1 grammer with example.
12. Define useless Symbol.
13. Define Nullable symbol.
14. Every CFL is regular language. State True or False.
15. Define Left Grammer ?
16. What are the types of grammer's in Chomsky hierarchy?
17. Write the steps for eliminating Epsilon production in a CFL.
18. Write formal definition of DPDA .
19. Differentiate between DODA & NPDA.
20. What is difference between TM and FA.
21. Construct NFA for language L where  $L=\{a(a+b)^*b\}$
22. Construct NFA for language L where  $L=00(0+1)^*1$
23. FA have only 1 start state. State True or False.
24. FA have more than one final states. Justify True or False.
25. Write smallest possible strings accepted by following regular expression  $0^*1+(0+11)10$
26. Find out R.E. for the set of all string over  $\{a,b\}$  of even length
27. Explain Kleen closure and positive closure with example
28. Give any two identities of regular expressions.
29. State pumping lemma of regular set and also state its application.

30. Give two kinds of operations that can be carried out on regular languages.
31. Is  $(a^*+b^*)=(a+b)^*$  true? Justify
32. Define Positive closure.
33. Write smallest possible string generated by regular expression  $a(a+b)b^*$
34. Why type-1 grammars are called "Context-sensitive?"
35. Define Nullable symbol
36. What is yield of derivation tree below?
37. Define useless symbol
38. Define unit production
39. Every CFL is regular language. State true or false.
40. Define ambiguous grammar.
41. Define left linear grammar.
42. What are the types of grammars in Chomsky hierarchy?
43. Define unrestricted grammar.
44. Define context sensitive grammar
45. Define Right linear grammar.
46. Define handle pruning
47. What is 'dangling else' problem
48. Write formal definition of DPDA
49. Write formal definition of NDPDA
50. The class of language accepted by DPDA and NPDA is same justify
51. Give diagrammatic representation of PDA.
52. Define ID for PDA
53. State formal definition of PDA' Differentiate between DPDA and NPDA
54. State two difference between PDA and FA
55. Write tuples of PDA
56. Class of CFG and PDA is same. Justify True/False.
57. Define Turing machine
58. State the use of working tape of LBA
59. List different ways to represent a Turing machine
60. State any 2 examples of decision problems
61. Halting problem for TM is unsolvable, state true or false
62. State any two examples of undecidable problems
63. Differentiate recursive and recursively enumerable languages.
64. What is difference between TM and FA
65. Every language accepted by TM is regular. Define ID of a Turing machine
66. Explain Move of TM
67. Define Decision problem

68. Define Recursive Language
69. List different areas of UTM
70. Define language accepted by NTM